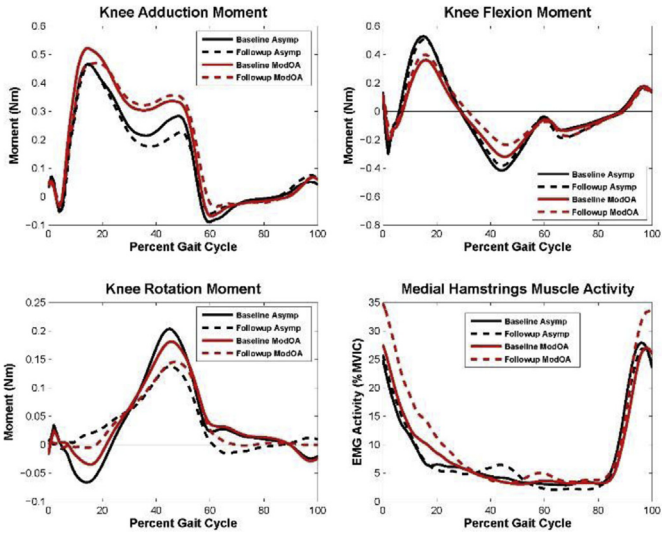
A QUANTITATIVE ASSESSMENT OF VARUS THRUST DURING WALKING IN WOMEN WITH EARLY AND ESTABLISHED MEDIAL KNEE OSTEOARTHRITTS

Mahmoudian, A.; Luyten, Frank P.; Jonkers, I.; van Dieen, J. H.; Bruijn, S. M.; Baert, I.C.A; Faber, G. S.; Verschueren, S.M.

published in
Osteoarthritis and Cartilage
2015

moment and neuromuscular patterns during gait were altered between sessions for both groups in the same direction, suggesting age-related changes independent of OA presence whereas other features had differential changes indicating an OA progression response.



133

PEOPLE WITH PATELLOFEMORAL OA WALK WITH DIFFERENT KNEE, HIP AND PELVIC KINEMATICS, COMPARED TO HEALTHY AGED MATCHED CONTROLS

K.M. Crossley †, A. Schache ‡, R. Hinman ‡, B. Vicenzino †, H. Ozturk ‡, J. Lentzos ‡, M. Munanto ‡, M. Pandy ‡. † *Univ. of Queensland, St Lucia, Australia;* ‡ *Univ. of Melbourne, Parkville, Australia*

Purpose: Patellofemoral osteoarthritis (PFJ OA) is a common disease, affecting 60-70% of those with symptomatic knee OA. To date, few studies have explored movement patterns of individuals with PFJOA. Kinematics of the pelvis, hip and knee have the capacity to influence PFJ loads and, if shown to be different in people with PFJ OA, may be the target of physical therapy intervention. This study aimed to assess the kinematics of the knee, hip and pelvis in PFJ OA patients, and compare these data to those of healthy, age-matched controls.
Methods: Sixty-nine participants (64% women, mean age 56 ± 10 years) with symptomatic (anterior knee pain aggravated by activities that load the PFJ such as stair ambulation, rising form sitting or squatting) and radiographic (osteophyte in the lateral PFJ on skyline radiographs) OA were recruited, as well as 18 aged-matched controls (78% women, mean age 53 ± 7 years) with no lower limb pain or radiographic OA evident on skyline or postero-anterior radiographs. Knee Injury and Osteoarthritis Outcome Score (KOOS) data were also collected from the PFJ OA participants.
Quantitative gait analyses were conducted during overground walking at self-selected speed. Calculations of pelvis, hip and knee kinematics were performed over the stance phase. Peak joint angles were identified in the first half of stance (contralateral toe off) and second half of stance (contralateral heel strike). Data were statistically analysed using the Analyses of Co-Variance (ANCOVA), with age and gender as covariates (p=0.05).
Results: Participants with PFJ OA reported KOOS-pain 65 ± 15, KOOS-symptoms 63 ± 16, KOOS-activities of daily living 73 ± 13, KOOS-sport/recreation 45 ± 23 and KOOS-quality of life 43 ± 16. Few differences in peak knee joint angles were observed between PFJ OA subjects and controls. PFJ OA subjects walked with less knee internal rotation in the second half of stance phase -2 [-4 to 0], compared to controls. At the hip, PFJ OA participants walked with less hip extension in the second half of stance 7 [3 to 11], less hip adduction in early stance -2 [-4 to -1], greater hip adduction at second half of stance 3 [1 to 5], and less hip internal rotation in the first half of stance-5 [-7 to -3], compared to controls.
Conclusions: While few differences in knee kinematics were observed in people with PFJ OA compared with aged-matched controls, reduced knee internal rotation, increased hip adduction and medial pelvic tilt were observed, and may be associated with increased PFJ loads. Other kinematic differences, such as anterior tilt, may reflect a mechanism to off-load the PFJ. The results of this study may provide a basis for targeted muscle strengthening exercises and bracing to reduce the burden of PFJ OA.

134

A QUANTITATIVE ASSESSMENT OF VARUS THRUST DURING WALKING IN WOMEN WITH EARLY AND ESTABLISHED MEDIAL KNEE OSTEOARTHRITIS.

A. Mahmoudian †, F.P. Luyten ‡, I. Jonkers †, J.H. van Dieen §, S.M. Bruijn §, I.A. Baert §, G.S. Faber §, S.M. Verschueren †. † *KU Leuven, Leuven, Belgium;* ‡ *UZ-KU Leuven, Leuven, Belgium;* § *VU Univ. Amsterdam, Amsterdam, Netherlands;* ‖ *Univ. of Antwerp, Antwerp, Belgium*

Purpose: Varus thrust, known as an abrupt worsening of the existing varus during weight-bearing, has been shown to be present in patients with severe knee osteoarthritis (OA) and is considered as one of the risk factors for the incidence and progression of symptomatic medial knee OA. However, the association of varus thrust with increased severity of knee OA has not been studied yet. Therefore, this study compared the varus thrust during gait between patients with early medial knee OA, established OA and healthy controls. We were also interested to investigate the impact of the presence of varus thrust at baseline on functional decline and clinical worsening of the symptoms in women with medial knee OA at a 2-years follow up.
Methods: Eighteen women with early medial knee OA (according to the classification of Luyten et al), sixteen women with established medial knee OA and sixteen healthy controls were evaluated. At baseline and at two-year follow-up, pain, symptoms, and subjective functional ability were assessed using the Knee Injury and Osteoarthritis Outcome Score questionnaire, and objective functional ability was assessed using the Timed Up & Go test (TUG) and the Stair Climbing Test (SCT). In addition, varus thrust was measured by 3D motion analysis of normal gait at preferred speed, as an increase of the knee varus angle during the weight-bearing phase of gait.
Results: Both early and established OA groups reported significantly more knee pain and symptoms and worse functional ability compared to controls at baseline and also at two-year follow-up. However, none of the objective functional measures (SCT and TUG) were significantly different between the three groups. Varus thrust was significantly higher in both early and established OA subjects compared to the control group ($p < 0.001$ and $p = 0.003$, respectively).
In addition, the amount of varus thrust at baseline was significantly correlated with functional objective measures at follow-up (pTUG=0.010, pSCT=0.023). Moreover, baseline varus thrust was also significantly correlated with pain (pBaseline<0.001, pFollow-up=0.004), symptoms (pBaseline=0.008, pFollow-up=0.047) and ADL (pBaseline<0.001, pFollow-up<0.001) at both baseline and follow-up.
Conclusions: Higher values of varus thrust were found both in early and established stages of OA, suggesting that problems with dynamic stabilization of the knee are present already in the very beginning of knee OA, suggesting that varus thrust is probably not a result of disease progression. Varus thrust at baseline was related with poor subjective (ADL) and objective (SCT and TUG) physical function at two-year follow up, which may imply that varus thrust is a problem that has to be addressed in rehabilitation program.